

**RANUNCULUS (RANUNCULACEAE) IN NUEVO LEON, MEXICO, WITH
COMMENTS ON THE *R. PETIOLARIS* GROUP**

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ABSTRACT

Three relatively widespread taxa of *Ranunculus* are recorded from Nuevo León, México: *R. peruvianus*, *R. petiolaris* var. *arsenei*, and *R. petiolaris* var. *sierrae-orientalis*. A rationale is presented for recognizing both of the latter as distinct species: *R. fasciculatus* Sessé & Moç. and *R. sierrae-orientalis* (Benson) Nesom, *comb. nov.*, respectively. The primarily Mexican *R. petiolaris* var. *trahens* is broadly sympatric in south-central México with *R. petiolaris* (var. *petiolaris sensu lato*) as well as *R. fasciculatus* and consistently distinguished from both; var. *trahens* is elevated to specific rank as *R. trahens* (T. Duncan) Nesom, *comb. nov.* The remainder of the *R. petiolaris* complex in México is a variable group of plants that appears to comprise more than one evolutionary entity.

KEY WORDS: *Ranunculus*, Ranunculaceae, Nuevo León, México

In curation and identification of LL,TEX *Ranunculus* from northeastern México, the occurrence of three taxa is recorded from the state of Nuevo León: *R. peruvianus* Pers., *R. petiolaris* Kunth ex DC. var. *sierrae-orientalis* Benson, and *R. petiolaris* var. *arsenei* (Benson) T. Duncan. *Ranunculus cymbalaria* Pursh was collected in 1898 immediately adjacent to Nuevo León in the vicinity of Saltillo, Coahuila (*Palmer 178* [US!]), and it might be expected to occur in the area of high peaks immediately to the east of that city. The distribution of *R. cymbalaria* is primarily circumboreal in the northern hemisphere, occurring sporadically at high elevations into the western United States, southward into México, and extending into the Andean region of South America. *Ranunculus peruvianus* occurs in the areas of highest elevation in Nuevo León and southeastern Coahuila (Map 1). From that region, it is disjunct to the northern limit of its distribution in the Sierra del Carmen in northwestern

Coahuila. South from Nuevo León, it occurs in the Sierra de Guatemala of Tamaulipas, the high volcanic peaks of southeastern México (Veracruz, Edo. México, Oaxaca) and scattered localities through Central America into its primary range in Andean South America.

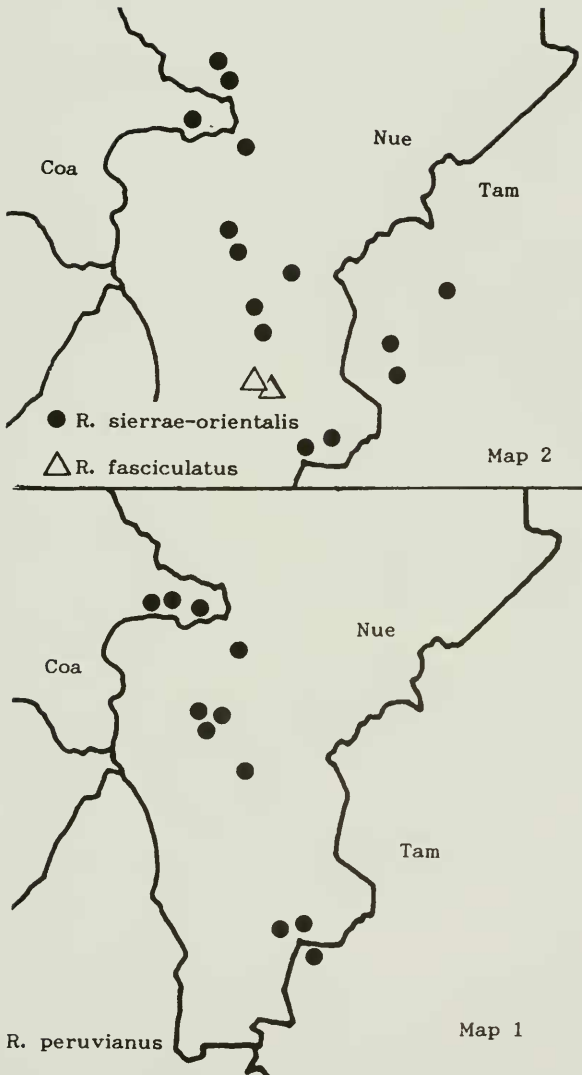
In contrast to the distinctive *Ranunculus cymbalaria* and *R. peruvianus*, the biological limits and taxonomy of the varieties of *R. petiolaris*, a member of the *R. hispidus* Michx. complex (*sensu* Duncan 1980), are subject to somewhat broad reinterpretation. Benson's concepts (1948) of *R. petiolaris* and taxa closely resembling it were significantly altered by Duncan (1980). It is difficult to reconcile the nomenclature of these two students of the genus, but Duncan's simpler treatment appears to be mostly effective in dealing with the patterns of variation. Duncan's conceptual modification of typical *R. petiolaris* appears to be justifiable (at least in part), but it is suggested below that var. *petiolaris sensu* Duncan may be more complex than allowed by him. The concept of var. *sierrae-orientalis* is returned to the strict sense originally proposed by Benson.

Status of *Ranunculus petiolaris* var. *sierrae-orientalis* :

Var. *sierrae-orientalis* in Coahuila, Nuevo León, and Tamaulipas (Map 2) is notably constant in morphology. The type of the taxon is from Tamaulipas (Map 2), and populations from this region of northeastern México constitute var. *sierrae-orientalis sensu stricto* (see further comments below). The strong contrast between var. *sierrae-orientalis* and var. *arsenei* is outlined in the following couplet, which also serves as a summary of their morphology. These characterizations are drawn from 30 specimens (LL,TEX,US) of var. *sierrae-orientalis* (from Coahuila, Nuevo León, and Tamaulipas), 2 (TEX) of var. *arsenei* (from Nuevo León), and many of the latter from over its range.

1. Leaves 3-parted or 3-foliolate, if compound then leaflets sessile or nearly so, main segments broadly ovate to obovate, coarsely toothed to shallowly lobed; petals 5-6; achene faces with numerous low papillae, each papilla producing a minute, erect hair; style slender from the base, arising almost immediately from the achene margin. var. *sierrae-orientalis*
1. Leaves (3-)5 foliolate, terminal leaflets almost always distinctly stalked, main segments narrowly rectangular to linear, deeply lobed; petals 10-16(-18); achene faces smooth, rarely with papillae; style arising from a thickened, triangular-deltate base. var. *arsenei*

Benson (1948) defined var. *sierrae-orientalis* as an endemic of northeastern México, but Duncan (1980) viewed it as continuing southward into Guanajuato, Hidalgo, Veracruz, Puebla, and Oaxaca. Plants of the *Ranunculus*



Map 1 (above). Distribution of *Ranunculus peruvianus* in northeastern México. The northernmost populations in northwestern Coahuila are not shown.
Map 2 (below). Distribution of *Ranunculus sierrae-orientalis* and *R. fasciculatus* in northeastern México. See text for further comments.

petiolaris complex from this more southern region (including the type locality of *R. petiolaris* in Veracruz), have been annotated by Duncan both as var. *sierrae-orientalis* and var. *petiolaris*. These plants are non-stoloniferous and produce achenes with relatively few papillae and thin-based styles as in var. *sierrae-orientalis*, but the leaves have stalked, narrow, deeply lobed segments similar to var. *arsenei*, and the flowers produce (5-)8-12 petals. The specimen of "var. *sierrae-orientalis*" illustrated by Duncan (Fig. 47) is from Puebla and is atypical of var. *sierrae-orientalis* sensu stricto in its large number of petals as well as its leaf morphology. Such plants are also outside the limits of var. *petiolaris* sensu Duncan, which Duncan (p. 74) noted has "petals 5, rarely greater than 5;" his annotations create a strong inconsistency with this characterization. It appears that there may be more than one evolutionary entity among these plants (*R. petiolaris* sensu stricto and some other), but their identification is unclear and needs to be reinvestigated.

Var. *sierrae-orientalis* was distinguished by Duncan (1980) from var. *petiolaris* by a receptacular ridge at the base of the gynoeceal region (vs. unridged in var. *petiolaris*) and an obovate (vs. flabellate) nectary scale. The small receptacular difference, however, appears to be inconsistent, and it is observed only on receptacles from which achenes have been released, a relatively uncommon characteristic of most collections. Further, the nectary scales in most plants of both varieties appear to be more obovate than flabellate, and Duncan's own illustrations of the nectary scales of these two taxa (Figs. 41c and 47c) also appear to contradict the putative distinction.

In summary, var. *sierrae-orientalis* is viewed here as a distinct species, clearly a member of the *Ranunculus petiolaris* complex but highly consistent in its own morphology while morphologically and geographically separated from its closest relatives.

Ranunculus sierrae-orientalis (Benson) Nesom, *comb. et stat. nov.* BA-
 SIONYM: *Ranunculus petiolaris* Kunth ex DC. var. *sierrae-orientalis*
 Benson, Amer. Midl. Naturalist 40:89. 1948.

Status of *Ranunculus petiolaris* var. *arsenei* and var. *trahens*

Ranunculus petiolaris var. *arsenei* from Nuevo León (Map 2) is represented by two collections, which significantly increase its geographic range past that shown by the distribution map in Duncan (1980): Nuevo León. Mpio. Aramberri: El Barreno, swamp in cedar forest, 1535 m, 5 Jul 1980, *Hinton 17863* (TEX); San Juan de Aviles, marsh in oak woods, 1480 m, 13 May 1992, *Hinton 21954* (TEX). Several general collections (LL, TEX) of var. *arsenei* from San Luis Potosí make its range more continuous southward from Nuevo León; Duncan did not map specimens of this taxon from San Luis Potosí, although

the type of *R. pringlei* Briq., which he cited as a synonym of var. *arsenei*, was collected from that state. The range of var. *arsenei* extends southward into Puebla and central Oaxaca, westward to Jalisco and Nayarit, and then northward up the sierra through Durango, Sonora, and Chihuahua into Arizona and the Davis Mountains of trans-Pecos Texas. The number of petals in var. *arsenei* commonly ranges up to 18, and this feature usually provides an immediate clue to the identity of this taxon.

In Duncan's view (1980, p. 74), "The varieties in *Ranunculus petiolaris* are recognized on the basis of minor morphological differences which correlate with altitudinal and/or habitat differences. In general, strong geographical overlap occurs in México and Guatemala between the wide-ranging *R. petiolaris* var. *petiolaris* and other varieties." Indeed, *R. petiolaris* var. *petiolaris* (sensu Duncan, and including a portion of var. *sierrae-orientalis* sensu Duncan) and var. *arsenei*, as well as var. *trahens* Duncan, are all broadly sympatric across the Mexican trans-volcanic region in the states of México, Michoacán, and Jalisco, but I have found no indication of the existence of ecological or phenological differences on numerous specimens of these taxa at LL, TEX, and US. Nor did Duncan (1980) provide any such indication in his characterizations of these taxa.

A partial clarification of the biological and taxonomic problem implied here can be provided by recognition of *Ranunculus petiolaris* var. *arsenei* as a distinct species. It has been described at that rank at least five times by previous botanists, according to the synonymy listed by Duncan. Benson (1948) treated it at varietal rank, but within *R. macranthus* Scheele, removed from the *R. petiolaris* complex. It is notable that Duncan found that var. *arsenei* and *R. macranthus* produce a flavonoid compound not found in any other species of the *R. hispidus* complex. According to Duncan (1980), the earliest name for var. *arsenei* at the higher rank is *R. fasciculatus* Sessé & Moçino (in contrast to *R. fascicularis* Muhl. ex Bigel., a widespread species of the eastern United States).

As a further taxonomic modification within this primarily Mexican group of broadly sympatric entities, the proposal is made here to recognize *Ranunculus petiolaris* var. *trahens* at specific rank. These plants are similar to *R. petiolaris* (sensu stricto) in achene morphology, but their flowers produce 8-11 petals (apparently never 5), and they are consistently different from typical *R. petiolaris* in their stoloniferous habit, producing no erect stems. Benson (1948) treated stoloniferous plants of this species complex (sensu Duncan) as *R. petiolaris*, assigning the non-stoloniferous forms mostly to categories within *R. geoides* Kunth and *R. pilosus* Kunth, but the original illustration of *R. petiolaris* by Kunth (in H.B.K., *Nov. Gen. Sp.*, 1821, pl. 428) gives no indication that the plant produced stolons. Duncan's var. *trahens* produces slender, lateral, stoloniform branches and apparently can be recognized even from herbarium specimens where the plants lack the basal portions. As ob-

served by Benson (1948, p. 87), "capability of the plants to produce roots at the nodes of the stems or lack of it is a character of unfailing constancy in all of the cases the writer has had an opportunity to investigate thoroughly in the field."

Ranunculus trahens (T. Duncan) Nesom, *comb. nov.* BASIONYM: *Ranunculus petiolaris* Kunth ex DC. var. *trahens* T. Duncan, Univ. Calif. Publ. Bot. 77:78. 1980.

The following key summarizes the morphology and taxonomy of the Mexican taxa of the *Ranunculus petiolaris* complex, according to their definitions as suggested in the present study.

1. Plants stoloniferous, stems all lateral; petals 8-11; achene faces papillate; style arising from a slender base. *R. trahens*
1. Plants not stoloniferous, stems erect; petals 5-16; achene faces smooth or papillate; style arising from a slender or broadly thickened base. ... (2)
 2. Petals 10-16(-18); achene faces smooth, rarely with papillae; style arising from a thickened, triangular-deltate base. ... *R. fasciculatus*
 2. Petals 5-12; achene faces with low papillae, each papilla producing a minute, erect hair; style slender from the base, arising almost immediately from the achene margin. (3)
3. Leaves 3-parted or 3-foliolate, if compound then leaflets sessile or nearly so, main segments broadly ovate to obovate, coarsely toothed to shallowly lobed; petals 5-6. *R. sierrae-orientalis*
3. Leaves (3-)5 foliolate, terminal leaflets almost always distinctly stalked, main segments narrowly rectangular to linear, deeply lobed; petals (5-) 8-12. *R. petiolaris* s.l.

Comments on the *Ranunculus hispidus* complex

A situation apparently analogous to that of the sympatric varieties of *Ranunculus petiolaris* exists within *R. hispidus* Michx. of the eastern United States (both species *sensu* Duncan 1980). *Ranunculus hispidus* var. *hispidus* and var. *caricetorum* (E. Greene) T. Duncan are relatively similar and have mostly separate (though somewhat overlapping) geographic ranges. *Ranunculus hispidus* var. *nitidus* (Ell.) T. Duncan, however, is morphologically separated from both var. *hispidus* and var. *caricetorum* by its production of

stolons, reflexed sepals, and distinctly wide-margined achenes. Var. *nitidus* is a widespread taxon broadly sympatric with var. *hispidus*, although, as noted by Duncan, the two differ in ecological preference and the margins of their ranges are different in extent. Duncan did not mention the occurrence of intermediates between these two taxa and there are relatively few problems in separating them when full plants or fruiting specimens are available. Var. *nitidus* was treated as *R. septentrionalis* Poir. var. *pteroctopus* Benson by Gleason & Cronquist (1963) but as *R. carolinianus* DC. by Radford *et al.* (1964), both of the latter listed as synonyms of var. *nitidus* by Duncan (1980). Gleason & Cronquist (1991) later adopted Duncan's treatment of *R. hispidus* as comprising three varieties, including var. *nitidus*. Evidence suggests, however, that var. *nitidus* and var. *hispidus* are closely similar entities but geographically overlapping and genetically isolated. Their broad sympatry and relatively constant morphology imply that even if the isolation is not complete, it is effective to a significant degree, and treatment of "var. *nitidus*" at specific rank appears to be justified (although what name should apply to the species is not clear). As surmised in the present paper, taxonomic difficulties in more than one group of *Ranunculus* are correlated with small morphological differences among closely related but distinct species.

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